CLAIMS

What is claimed is:

1. A method for delivering a melanocortin-4 receptor agonist to a mammalian subject, comprising: administering an amount of the melanocortin-4 receptor agonist to a tissue inside the nasal cavity or sinuses of the mammalian subject, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 1.5 times less than an amount required to achieve an equivalent effect when administered orally.

2. The method of claim 1, wherein the melanocortin-4 receptor agonist comprises a guanidine group.

3. The method of claim 1, wherein the the melanocortin-4 receptor agonist has a molecular weight of less than 900 grams mole.

4. The method of claim 1, wherein the molecular weight of the compound ranges from 450 grams per mole to 700 grams per mole.

5. The method of claim 1, wherein the melanocortin-4 receptor agonist comprises 3 or less amino acid residues.

6. The method of claim 1, wherein the melanocortin-4 receptor is not a peptide.

7. The method of claim 1, wherein the mammalian subject is a human.

8. The method of claim 7, wherein the human has a melanocortin-4 receptor mediated disease selected from obesity, an eating disorder, or type II diabetes.

9. The method of claim 1, further comprising administering the melanocortin-4 receptor agonist to the upper third of the nasal cavity.

10. The method of claim 9, wherein the melanocortin-4 receptor agonist is administered to the olfactory epithelium.

11. The method of claim 1, wherein the melanocortin-4 receptor agonist is administered as a powder or liquid nasal spray, as a suspension, as nose drops, as a gel or ointment, through a tube or catheter, by syringe, by packtail, by pledget, or by submucosal infusion.

12. The method of claim 1, wherein the melanocortin-4 receptor agonist is administered using an aerosol spray.

13. The method of claim 1, wherein the melanocortin-4 receptor agonist is administered as part of a pharmaceutical formulation that comprises the melanocortin-4 receptor agonist and a carrier.

14. The method of claim 1, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 2.5 times less than the amount required to achieve the equivalent effect when administered orally.

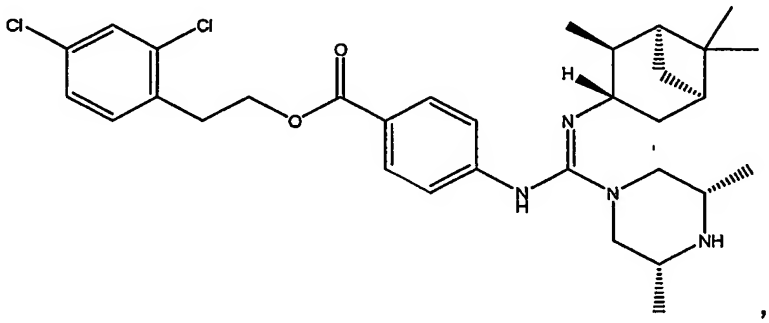
15. The method of claim 1, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 4.0 times less than the amount required to achieve the equivalent effect when administered orally.

16. The method of claim 1, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 5.0 times less than the amount required to achieve the equivalent effect when administered orally.

17. The method of claim 1, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 10.0 times less than the amount required to achieve the equivalent effect when administered orally.

18. The method of claim 1, wherein the amount of the melanocortin-4 receptor agonist admininstered to the tissue inside the nasal cavity or sinuses is at least 12.0 times less than the amount required to achieve the equivalent effect when administered orally.

19. The method of claim 1, wherein the melanocortin-4 receptor agonist is selected from



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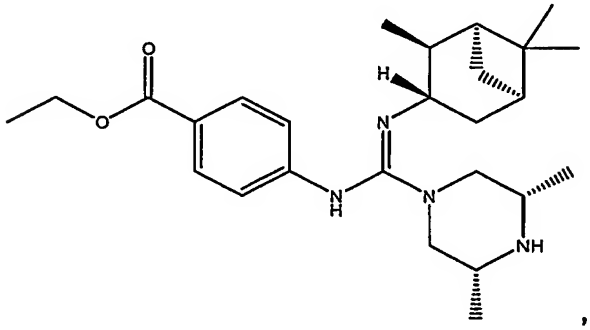

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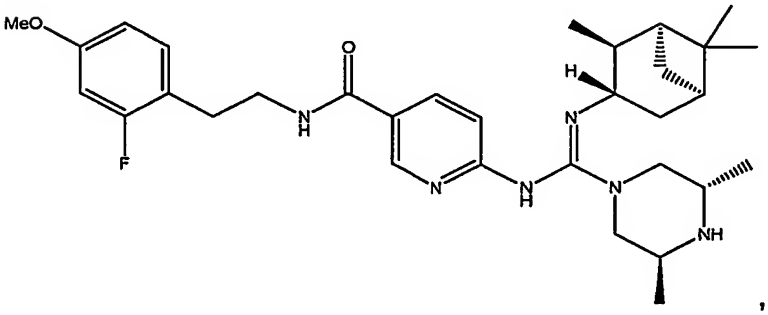

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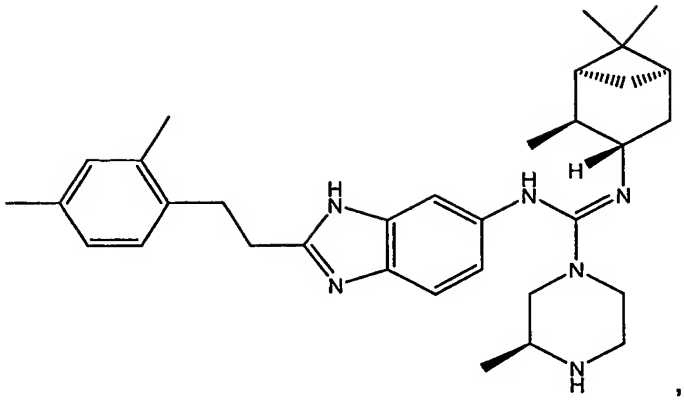
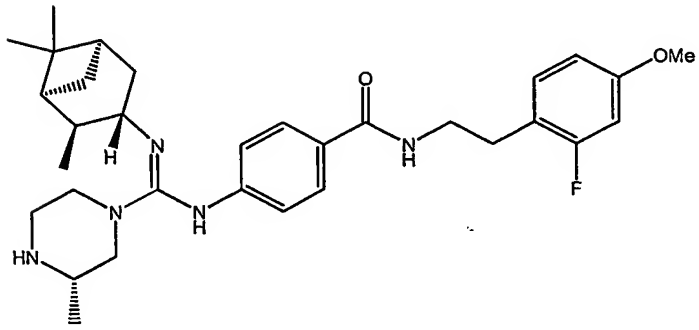
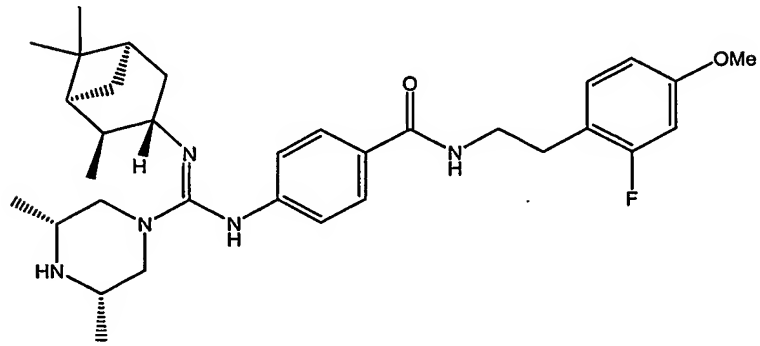
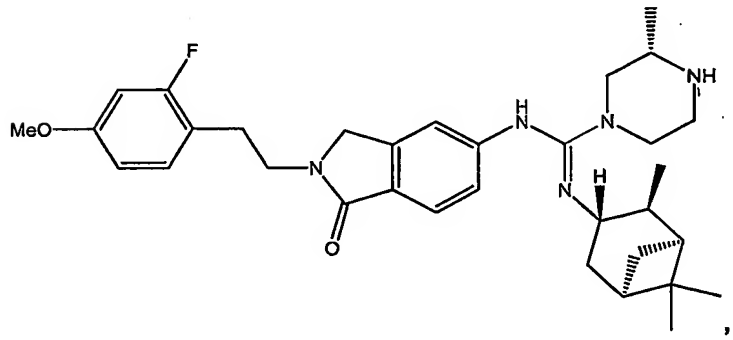
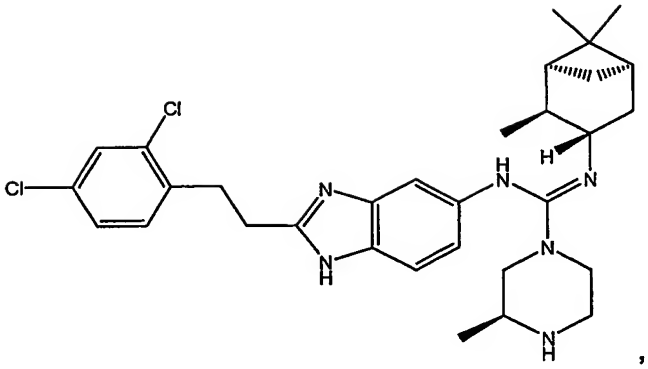
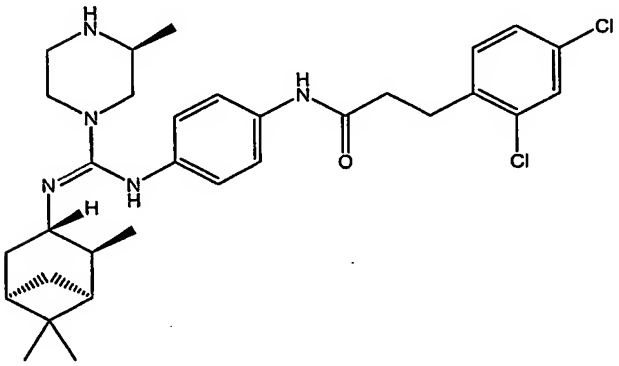
6  ,

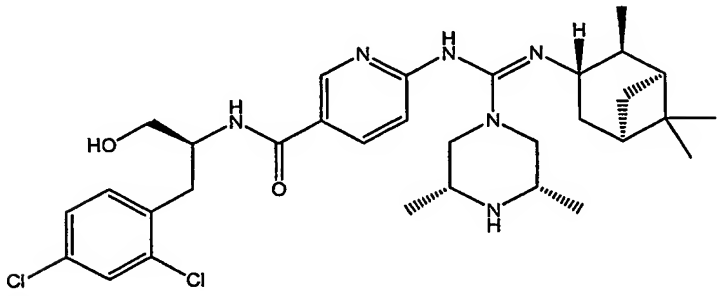
7  ,

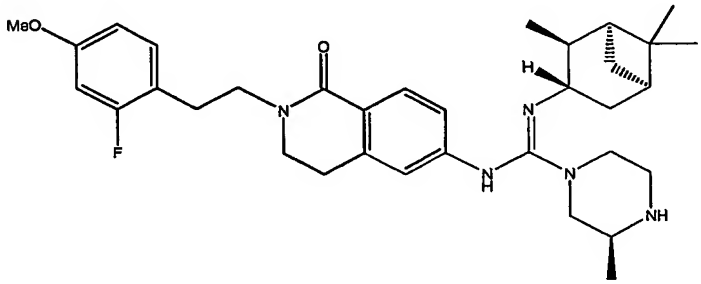
8  ,

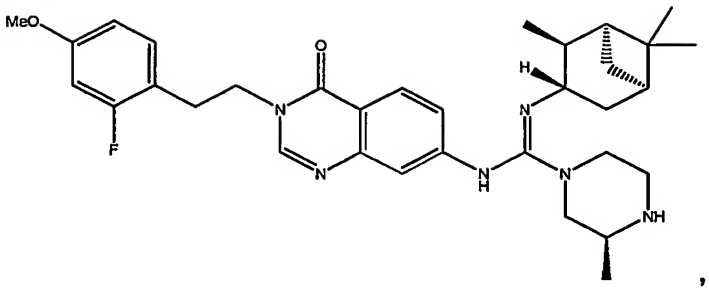
9  ,

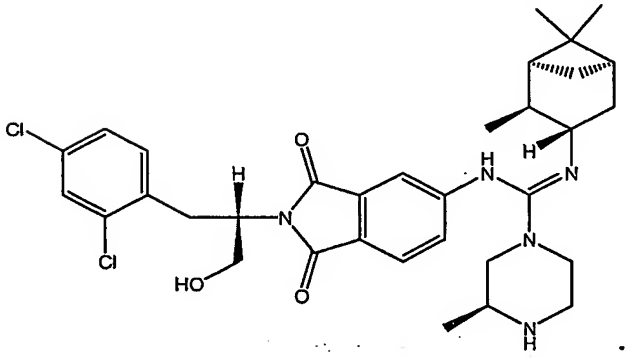
10  ,

11  ,

12  ,

13  ,

14  , or

15  .